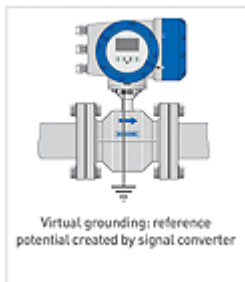


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Virtual Grounding

Cost effective grounding of aggressive products - virtual grounding for flowmeters

Since many years, the electromagnetic flowmeters (EMFs) of the KROHNE OPTIFLUX series are proven and tested measurement devices for recording the volume flow of electrically conductive liquids. In certain applications, the customary earthing of EMFs may cause problems: For example, if this deals with the handling of aggressive products, the conventional procedure is that the grounding and protection rings usually have to be ordered from expensive special materials.

KROHNE has developed a solution for this problem: the "virtual reference" or "virtual grounding" that does without grounding rings and electrodes.

The alternative to classical grounding

With the virtual grounding, the EMF sensor can be installed in any type of pipeline without grounding rings or electrodes. The input amplifier of the IFC 300 converter records the potentials of the measuring electrodes and a voltage is created. It corresponds to the potential of the ungrounded liquid according to a patented method. This voltage is used as the reference potential for signal processing. No interfering potential differences occur between the reference potential and the voltage on the measurement electrodes. KROHNE has patented this method for the virtual referencing of EMFs and is able to install it in all devices of the OPTIFLUX series in combination with the IFC 300 converter.

Advantages compared with the classical grounding

When using the virtual grounding, additional grounding materials such as grounding rings are no longer required. This means lower costs and an easier installation. This advantage should not be underestimated as a faulty grounding is the most common cause of error when commissioning an EMF. There is no risk of electrolytic destruction when there are potential differences in the system, such as when using electrodes. No equalization current flows over the product or grounding lines.

Developed for difficult applications

KROHNE EMFs with virtual grounding can also be installed in systems where voltage and current are applied to the pipeline, for example in electrolytic and galvanic systems. Due to highly aggressive products, grounding rings that are made of special materials such as tantalum, nickel or titanium, have to be used in these applications. When dealing with nominal widths of, e.g. DN 100, considerable efforts for investment conditions result. The use of the EMFs with virtual grounding is the most economical solution in such cases. The virtual grounding is basically possible from a nominal width of DN 10 and from a conductivity of $\geq 200 \mu\text{S}/\text{cm}$. If these conditions are fulfilled, the KROHNE EMFs can be installed in all systems where the classical grounding is a problem due to the reasons mentioned.

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OPTIFLUX 5300 with ceramic lining measures highly abrasive products

The OPTIFLUX 5300 from KROHNE has been especially developed for demanding applications where acids, leaching, pastes, slurry or other aggressive products have to be measured - even those with a high solid content. The flowmeter is characterized by its ceramic lining that is as hard as a diamond and its high degree of accuracy. Leading calibration authorities use the OPTIFLUX 5300 as a master or standard transfer device for calibrating other flowmeters. Its high resistance against abrasion, the device has proven itself once again: The Dutch company Nedmag Industries with its location in Veendam is the global market leader for producing burned magnesium oxide. This is required for the manufacturing of magnesium spinel, an environmentally friendly fireproof material for constructing and lining cement kilns or steel furnaces.

A magnesium hydroxide slurry with a solid matter content of 53% is prepared for the production of the magnesium oxide. Nedmag Industries applies a KROHNE OPTIFLUX 5300 for measuring the flow of this highly abrasive slurry. The company made the decision for the OPTIFLUX because they had gathered extensive experience with the use of KROHNE flowmeters over many years.

With the OPTIFLUX 5300, KROHNE has a standard device on offer for this demanding application. The sensor is fitted with a highly resistant ceramic (ZrO₂) liner. The IFC 300 converter offers a high measuring accuracy of 0.15% and versatile diagnosis possibilities for controlling processes. As a combination, they generate a durable unit that can reliably measure the ductile and highly abrasive slurry over many years.

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OPTIMASS 1300 solves measurement problems at Thomas Hardy Kendal

The beverage producer Thomas Hardy Kendal uses KROHNE OPTIMASS 1300 for the production of a new drink. For the production, the flow of different contents, such as fruit juice, wine, alcohol, sugar and water has to be measured with speeds between 3 and 10 liters per second that differ considerably in temperature and viscosity. Until today, the British company has been using an electromagnetic flowmeter. However, this could only be used for conductive products. As one of the contents of the new product is a non-conductive de-ionized sweetener, the company had to find a new measuring device for this application, and made the decision for the OPTIMASS 1300. The device that belongs to the KROHNE OPTIMASS series is based upon the Coriolis effect and is therefore independent from the conductivity of the product.

The OPTIMASS 1300 is the only mass flow sensor in its class that is fitted with a secondary pressure containment up to 100 bar as standard. The device determines the mass flow of liquids and gases as well as the density and concentration of liquids with an accuracy of $\pm 0.2\%$ reliably. The straight twin measuring tube is made of stainless steel as standard and features an optimized flow splitter for minimal pressure loss. The ability for no-load running and cleaning is therefore given. The OPTIMASS 1300 is independent of the type of installation as well as external influences. All common process and hygienic connections are available.

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